



City of Alexandria Storm Sewer Capacity Analysis

Task Order 2B - Cleaning & CCTV (Business Center Drive & Colvin St)

PREPARED FOR:

**CH2M HILL** 

PREPARED BY:

Baker

DATE:

February 24, 2012

## Field Work Summary (Nov 17-25, 2011)

VPS reported to Baker that large amounts of debris had to be removed from the subject storm pipes before inspection was possible. VPS estimated that some pipes were more than 90% filled with material prior to cleaning operations. It is to be noted that following the first round of cleaning, additional debris continued to wash into the subject storm pipes due to subsequent rain events. Following the cleaning, the pipes showed to be in generally good conditions, though there are occasional cracks, minor breaks, or intruding laterals; as noted in the inspection report. A few pipes have repair patches visible on the top edge. These defects are noted in further detail in the hard copy of VPS's report. Aside from the initial heavy buildup of debris, there does not appear to be any major blockages in the subject pipes.

VPS inspected approximately 1,718 linear feet of 36-inch diameter reinforced concrete pipe.



## VIDEO PIPE SERVICES, INC.

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CH2M Hill 1100 Wayne Ave. Suite 670 Silver Spring, MD 20910

Prepared For: Laurens VanDerTak

City of Alexandria
Storm Sewer Capacity Analysis Contract
November 17 – 25, 2011

CCTV Surveys List for CH2MIHILL

Number of surveys in this list is

as of Wednesday, November 30, 2011

15

#

Unit of measure:

Scheduled Surveyed Length Length 126.0 52.0 261.0 79.0 261.0 174.0 87.0 95.0 85.0 94.0 164.4 39.0 38.0 119.0 43.2 1,638.6 126.0 261.0 261.0 87.0 95.0 94.0 119.0 52.0 174.0 85.0 164.4 39.0 38.0 43.2 Total Scheduled Length Number Media A-5 A-5 A-2 A-2 A-3 A-3 A-3 A-3 A-5 A-5 A-5 A-1 A-1 A-4 A-5 Pre Clean I I I I I I I I 工 I T I I I I Size inch 36 36 36 36 36 36 36 36 36 36 36 36 36 36 36  $\supset$  $\supset$  $\supset$  $\supset$ Ω  $\supset$  $\supset$ STRUCTURE-1 END OF PIPE Finish MH **BURIED MH BURIED MH** BURIED MH **BURIED MH** OUTFALL OUTFALL INLET-2 MH-3 9-HW MH-5 MH-3 9-HW MH-2 STRUCTURE-1 STRUCTURE-1 STRUCTURE-1 **BURIED MH-2 BURIED MH-2** Start MH INLET-1 INLET-1 MH-5 MH-5 MH-3 MH-4 MH-4 MH-2 MH-1 MH-1 **BUSINESS CENTER DR BUSINESS CENTER DR BUSINESS CENTER DR BUSINESS CENTER DR BUSINESS CENTER DR** BUSINESS CENTER DR **BUSINESS CENTER DR BUSINESS CENTER DR BUSINESS CENTER DR BUSINESS CENTER DR BUSINESS CENTER DR COLVIN ST COLVIN ST** COLVIN ST COLVIN ST Street 11/17/2011 11/17/2011 11/18/2011 11/18/2011 11/19/2011 11/19/2011 11/19/2011 11/22/2011 11/25/2011 11/25/2011 11/25/2011 11/25/2011 11/19/2011 11/25/2011 11/25/2011 Setup Date 10 12 5 4 15 7 ~ 7 က 4 2 9 7 ∞ 6

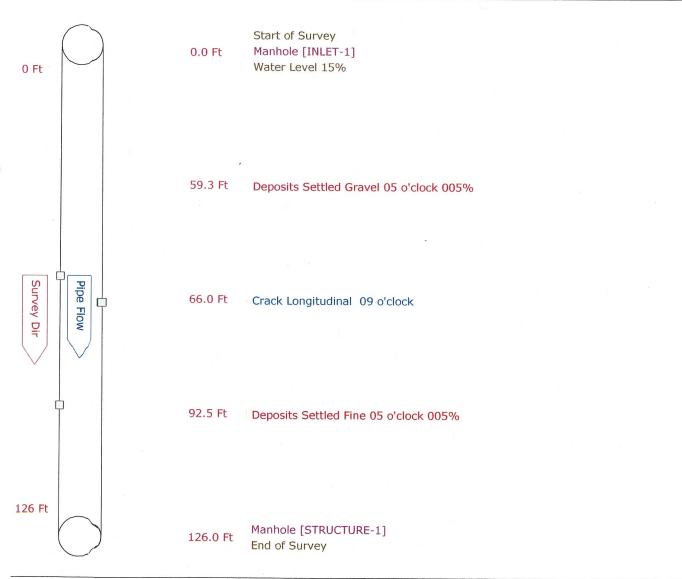
1,717.6

Total Length Surveyed



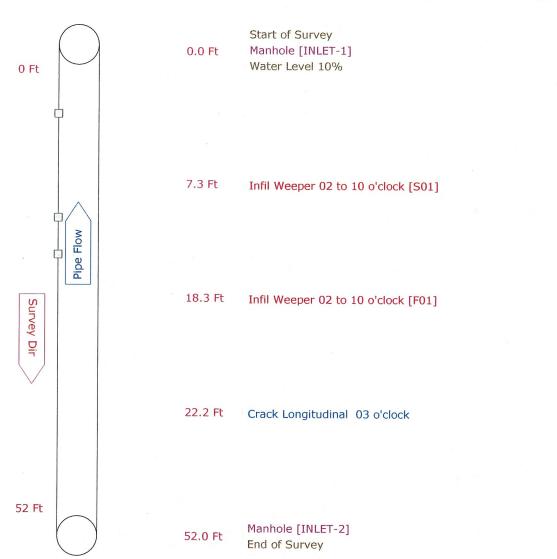
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the erapine report of Fort	TEET 7	101 01121011	1 11LL
Setup 1 Surveyor JRH	Certificate #	U-809-9224 <b>Sys</b>	stem Owner CITY OF ALEXANDRIA
Drainage Survey Cu	stomer CH2MHILL		
P/O # Date 20	011/11/17 <b>Time</b> 8:20	Street COLVIN ST	
City ALEXANDRIA	Further location details	3	
Start INLET-1	Rim to invert 0.00	Grade to invert	Rim to grade Ft
Finish STRUCTURE-1	Rim to invert 0.00	Grade to invert	Rim to grade Ft
Use Stormwater	<b>Direction</b> Downstream	Flow control Not Co	ntrolled <b>Media No</b> A-1
Shape Circular	Height 36 Width	ins Preclean H	Year Cleaned 2011/11/16
Material Reinforced Concrete Pipe	Joint length 3.0	Ft Total length 126.0	Ft Length Surveyed 126.00
Lining	Year laid	Year rehabilitated	Weather Light Rain
Purpose Routine Assessment		Cat	
Additional info		Struct	ural O&M Constructiona
Location Parking Lot		Miscel	aneous Hydraulic
Project CH2MHI-2			Work Order
Northing	Easting	Elevation	
Coordinate System		GPS Accu	racy





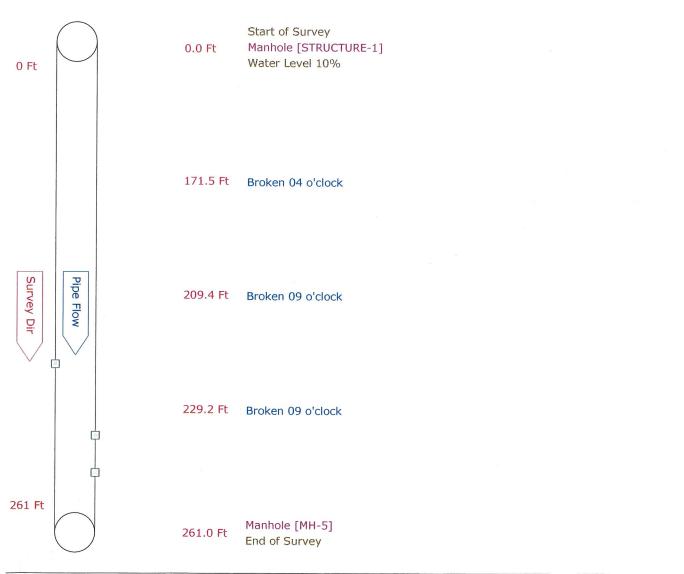
7	101 OF IZIVIT TILL	
Certificate #	U-809-9224 System	Owner CITY OF ALEXANDRIA
stomer CH2MHILL		
011/11/17 <b>Time</b> 16:10	Street COLVIN ST	
Further location details		
Rim to invert 0.00	Grade to invert R	im to grade Ft
Rim to invert 0.00	Grade to invert R	m to grade Ft
<b>Direction</b> Upstream	Flow control Not Controlle	d <b>Media No</b> A-1
Height 36 Width	ins Preclean H	Year Cleaned 2011/11/16
Joint length 3.0 F	t Total length 52.0 Ft	Length Surveyed 52.00
Year laid Ye	ear rehabilitated Wea	ther Light Rain
	Cat	
	Structural	O&M Constructional
	Miscellaneo	us Hydraulic
	Wo	rk Order
Easting	Elevation	
	GPS Accuracy	
	Certificate #  Istomer CH2MHILL  IO11/11/17 Time 16:10  Further location details  Rim to invert 0.00  Rim to invert 0.00  Direction Upstream  Height 36 Width  Joint length 3.0 F  Year laid Ye	Certificate # U-809-9224 System 6 Istomer CH2MHILL  011/11/17 Time 16:10 Street COLVIN ST  Further location details  Rim to invert 0.00 Grade to invert Ri Rim to invert 0.00 Grade to invert Ri  Direction Upstream Flow control Not Controlle  Height 36 Width ins Preclean H  Joint length 3.0 Ft Total length 52.0 Ft  Year laid Year rehabilitated Weat  Cat  Structural  Miscellaneon  Wo  Easting Elevation





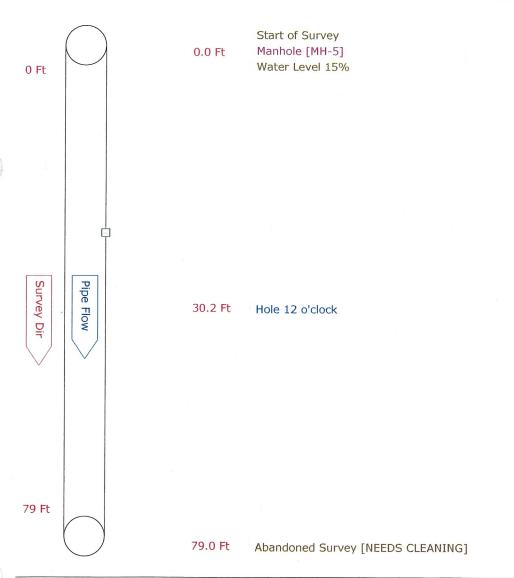
## Pipe Graphic Report of PSR STRUCTURE-1 X for CH2MIHILL

Setup 3 Surveyor JRH	Certificate # U-809	9-9224 System Owner CITY OF	ALEXANDRIA
Drainage Survey Cu	stomer CH2MHILL		
P/O # Date 20	011/11/18 <b>Time</b> 15:20 <b>Str</b>	eet BUSINESS CENTER DR	
City ALEXANDRIA	Further location details		
Start STRUCTURE-1	Rim to invert 0.00 Grade	e to invert Rim to grade	Ft
Finish MH-5	Rim to invert 0.00 Grade	e to invert Rim to grade	Ft
Use Stormwater	Direction Downstream Flow	v control Not Controlled Media No	A-2
Shape Circular	Height 36 Width in	s Preclean H Year Cle	aned 2011/11/16
Material Reinforced Concrete Pipe	Joint length 3.0 Ft To	otal length 261.0 Ft Length Surve	yed 261.00
Lining	Year laid Year reh	nabilitated Weather Light Rain	
Purpose Routine Assessment	Cat		
Additional info		Structural O&M	Constructional
Location Parking Lot		Miscellaneous Hydraulic	
Project CH2MHI-2		Work Order	
Northing	Easting	Elevation	
Coordinate System		GPS Accuracy	



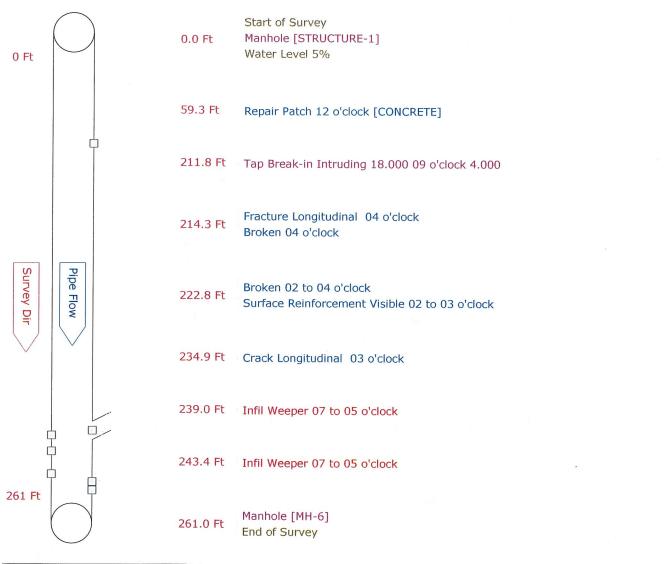


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Certificate #	U-809-9224 <b>System</b>	Owner CITY OF ALEXANDRIA
stomer CH2MHILL		
11/11/18 <b>Time</b> 15:31	Street BUSINESS CENTE	R DR
Further location details		
Rim to invert 0.00	Grade to invert R	im to grade Ft
Rim to invert 0.00	Grade to invert R	im to grade Ft
<b>Direction</b> Downstream	Flow control Not Controlle	d <b>Media No</b> A-2
Height 36 Width	ins Preclean H	Year Cleaned 2011/11/16
Joint length 3.0 F	t Total length Ft	Length Surveyed 79.00
Year laid Ye	ear rehabilitated Wea	ather Light Rain
	Cat	
	Structural	O&M Constructional
	Miscellaneo	us Hydraulic
	We	ork Order
Easting	Elevation	
	GPS Accuracy	
	Certificate # stomer CH2MHILL 11/11/18 Time 15:31 Further location details Rim to invert 0.00 Rim to invert 0.00 Direction Downstream Height 36 Width Joint length 3.0 F Year laid Ye	Certificate # U-809-9224 System  stomer CH2MHILL  11/11/18 Time 15:31 Street BUSINESS CENTE  Further location details  Rim to invert 0.00 Grade to invert R  Rim to invert 0.00 Grade to invert R  Direction Downstream Flow control Not Controlle  Height 36 Width ins Preclean H  Joint length 3.0 Ft Total length Ft  Year laid Year rehabilitated Weat  Cat  Structural  Miscellaneo



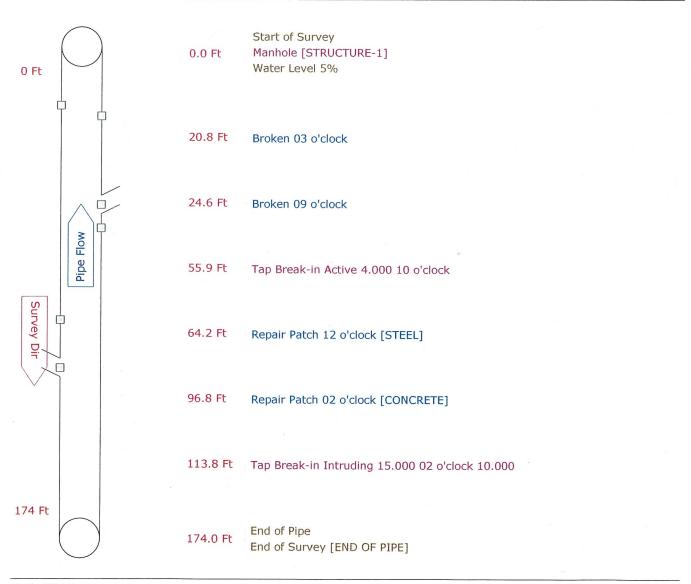


Setup	5 Surveyor	JRH		Certificate #	U-809-9224	System Owner	CITY OF ALEXANDRIA
Drainage	9	Survey	Customer CH	2MHILL			
P/O #		Date	2011/11/19	Time 13:20	Street COL	VIN ST	
City	ALEXANDRIA		Further loc	ation detail	s		
Start	STRUCTURE-1		Rim to inv	<b>ert</b> 0.00	Grade to inver	Rim to g	rade Ft
Finish	MH-6		Rim to inv	<b>ert</b> 0.00	Grade to inver	Rim to g	rade Ft
Use Sto	ormwater	- 25	Direction	Downstream	Flow control	Not Controlled	Media No A-3
Shape	Circular		Height	36 Width	ins Precle	ean H	Year Cleaned 2011/11/16
Material	Reinforced Con	crete Pipe	Joint le	ength 3.0	Ft Total length	261.0 Ft Len	gth Surveyed 261.00
Lining			Year la	id	Year rehabilitated	l Weather	Light Rain
Purpose	Routine Assess	ment			Cat		
Addition	al info			181		Structural O	&M Constructional
Location	Parking Lot					Miscellaneous Hy	ydraulic
Project	CH2MHI-2					Work Ord	er
Northing	ı	•	Easting		Elev	ation	
Coordina	ate System				GF	S Accuracy	



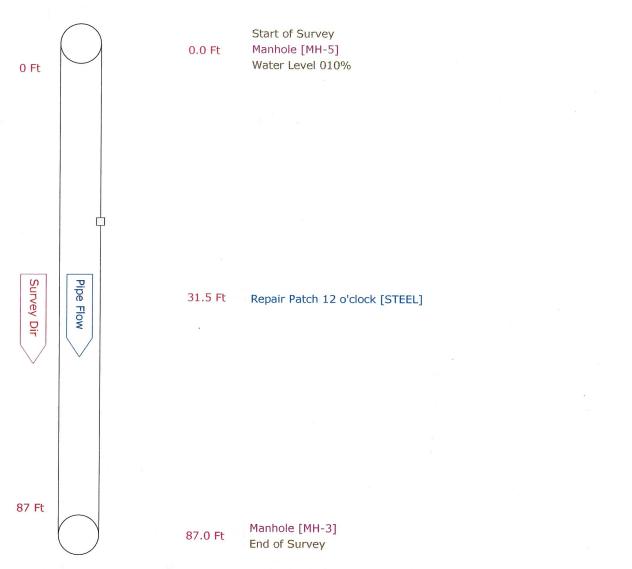


Setup 6 Surveyor JRH	Certificate # U-809-9224	System Owner CITY OF ALEXANDRIA
Drainage Survey Cus	stomer CH2MHILL	
P/O # Date 20	011/11/19	/IN ST
City ALEXANDRIA	Further location details	
Start STRUCTURE-1	Rim to invert 0.00 Grade to invert	Rim to grade Ft
Finish END OF PIPE	Rim to invert 0.00 Grade to invert	Rim to grade Ft
Use Stormwater	Direction Upstream Flow control	Not Controlled Media No A-3
Shape Circular	Height 36 Width ins Precle	an H Year Cleaned 2011/11/16
Material Reinforced Concrete Pipe	Joint length 3.0 Ft Total length	174.0 Ft Length Surveyed 174.00
Lining	Year laid Year rehabilitated	Weather Light Rain
Purpose Routine Assessment	Cat	
Additional info		Structural O&M Constructional
Location Parking Lot		Miscellaneous Hydraulic
Project CH2MHI-2		Work Order
Northing	Easting Eleva	ation -
Coordinate System	GP	S Accuracy



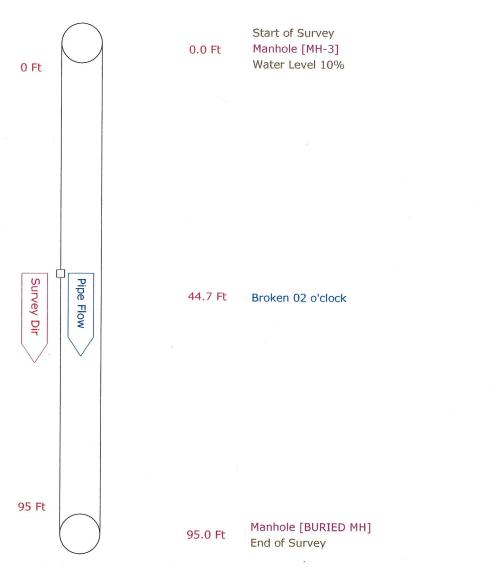


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Setup 7 Surveyor JRH	Certificate #	U-809-9224	System Owner CITY OF	ALEXANDRIA
Drainage Survey Cu	stomer CH2MHILL			
P/O # Date 2	011/11/19 <b>Time</b> 14:54	Street BUSINES	SS CENTER DR	
City ALEXANDRIA	Further location details			
Start MH-5	Rim to invert 0.00	Grade to invert	Rim to grade	Ft
Finish MH-3	Rim to invert 0.00	Grade to invert	Rim to grade	Ft
Use Stormwater	<b>Direction</b> Downstream	Flow control No	ot Controlled Media No	A-3
Shape Circular	Height 36 Width	ins Preclean	H Year Clea	aned 2011/11/16
Material Reinforced Concrete Pipe	Joint length 3.0 I	Ft Total length 8	7.0 Ft Length Survey	red 87.00
Lining	Year laid Y	ear rehabilitated	Weather Light Rain	ar .
Purpose Routine Assessment		Cat		
Additional info		S	tructural O&M	Constructional
Location Parking Lot		IV	fiscellaneous Hydraulic	
Project CH2MHI-2			Work Order	
Northing	Easting	Elevatio	n ·	
Coordinate System		GPS A	Accuracy	
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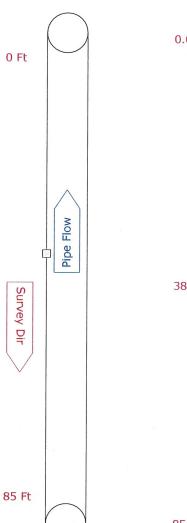


Setup     8     Surveyor     JRH     Certificate #     U-809-9224     System Owner     CITY OF ALEXANDRIA       Drainage     Survey Customer     CH2MHILL       P/O #     Date     2011/11/19     Time     15:09     Street     BUSINESS CENTER DR       City     ALEXANDRIA     Further location details
P/O # Date 2011/11/19 Time 15:09 Street BUSINESS CENTER DR
City ALEXANDRIA Further location details
Start MH-3 Rim to invert 0.00 Grade to invert Rim to grade Ft
Finish BURIED MH Rim to invert 0.00 Grade to invert Rim to grade Ft
Use Stormwater Direction Downstream Flow control Not Controlled Media No A-3
Shape Circular Height 36 Width ins Preclean H Year Cleaned 2011/11/
Material Reinforced Concrete Pipe Joint length 3.0 Ft Total length 95.0 Ft Length Surveyed 95.00
Lining Year laid Year rehabilitated Weather Light Rain
Purpose Routine Assessment Cat
Additional info Structural O&M Construction
Location Parking Lot Miscellaneous Hydraulic
Project CH2MHI-2 Work Order
Northing Elevation
Coordinate System GPS Accuracy





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Setup 9 Surveyor JRH	Certificate #	U-809-9224 System O	wner CITY OF ALEXANDRIA
Drainage Survey C	ustomer CH2MHILL		
P/O # Date	2011/11/22 <b>Time</b> 11:27	Street BUSINESS CENTER	DR
City ALEXANDRIA	Further location details		
Start MH-4	Rim to invert 0.00	Grade to invert Rin	n to grade Ft
Finish MH-6	Rim to invert 0.00	Grade to invert Rin	n to grade Ft
Use Stormwater	<b>Direction</b> Upstream	Flow control Not Controlled	Media No A-4
Shape Circular	Height 36 Width	ins Preclean H	Year Cleaned 2011/11/16
Material Reinforced Concrete Pipe	Joint length 3.0 F	t Total length 85.0 Ft	Length Surveyed 85.00
Lining	Year laid Y	ear rehabilitated Weatl	ner Light Rain
Purpose Routine Assessment		Cat	
Additional info		Structural	O&M Constructional
Location Parking Lot		Miscellaneous	Hydraulic
Project CH2MHI-2		Wor	k Order
Northing	Easting	Elevation	-
Coordinate System		GPS Accuracy	



Start of Survey
0.0 Ft Manhole [MH-4]
Water Level 15%

38.3 Ft Crack Longitudinal 03 o'clock

85.0 Ft Manhole [MH-6] End of Survey



4
/16
onal

O Ft
Survey Dir
94 Ft

0.0 Ft

Start of Survey Manhole [MH-4] Water Level 10%

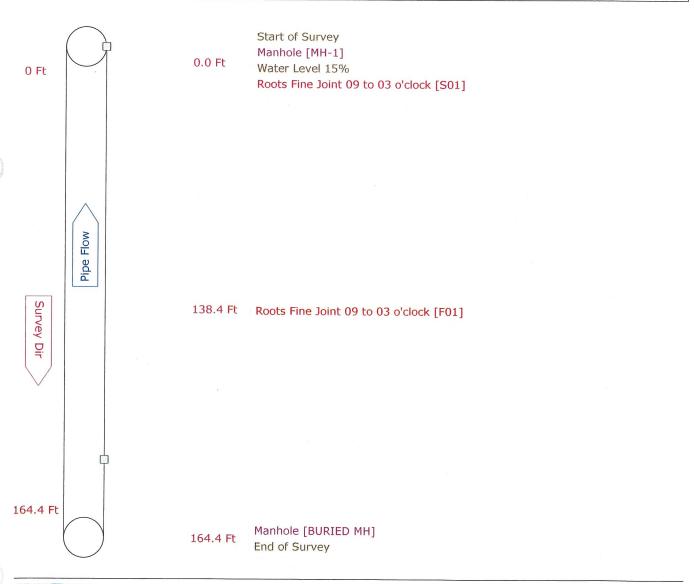
94.0 Ft Manhole [BURIED MH]
End of Survey



Pipe Gr	aphic Report	of PSR	BURIED I	ИΗ	В		foi	r C	H2MIHILL			
Setup	11 Surveyor	JRH		Cert	ificate #	# U-809	9224		System O	wner	CITY OF A	LEXANDRIA
Drainag	je	Survey (	Customer	CH2MHI	LL							
P/O #		Date	2011/11/25	Time	12:36	Stre	et B	USIN	IESS CENTER	DR		
City	ALEXANDRIA		Furthe	r locatio	n detail	s						
Start	MH-1		Rim to	invert	0.00	Grade	to inv	vert	Rin	n to gra	ıde	Ft
Finish	BURIED MH		Rim to	invert	0.00	Grade	to inv	/ert	Rin	n to gra	ıde	Ft
Use St	ormwater		Directi	on Ups	stream	Flow	contr	ol l	Not Controlled	IV	ledia No	A-5
Shape	Circular		Heig	jht 36	Width	ins	Pre	eclea	ın H	)	Year Clean	ed 2011/11/16
Materia	Reinforced Con-	crete Pipe	Joi	nt lengtl	<b>1</b> 3.0	Ft To	tal len	gth	164.4 Ft	Lengt	h Surveye	<b>d</b> 164.40
Lining			Yea	ar laid		Year reh	abilita	ted	Weatl	her D	ry	
Purpose	e Routine Assess	ment				Cat						
Addition	nal info								Structural	0&1	M	Constructional
Locatio	n Parking Lot								Miscellaneous	Hyd	raulic	
Project	CH2MHI-2								Worl	k Order	•	

**GPS Accuracy** 

**Easting** 





Northing '

**Coordinate System** 

**GPS Accuracy** 

0 Ft Survey Dir Survey Dir

**Northing** 

**Coordinate System** 

Start of Survey
0.0 Ft Manhole [MH-1]

**Easting** 

Water Level 15%

39.0 Ft End of Pipe End of Survey



Pipe G	raphic	Report o	of PSR	BURIED I	MH-2	E	3	fe	or	CH2MIHILL			
Setup	13	Surveyor	JRH		Certi	ficate #	<b>#</b> U-80	9-9224	ļ	System	Owner	CITY OF A	LEXANDRIA
Drainag	ge		Survey	Customer	CH2MHIL	L							
P/O #			Date	2011/11/25	Time	15:26	St	reet	BUSI	NESS CENTE	R DR		
City	ALE	XANDRIA		Furthe	r location	n detail	s						
Start	BURIE	D MH-2		Rim to	invert	0.00	Grac	le to i	nvert	R	im to gı	rade	Ft
Finish	OUTF	ALL		Rim to	invert	0.00	Grac	le to i	nvert	R	im to gı	rade	Ft
Use St	tormwat	ter		Directi	on Dow	nstrean	n Flo	w con	trol	Not Controlle	d	Media No	A-5
Shape	Circula	ır		Heig	ht 36	Width	ii	ns P	recle	an H		Year Clear	ned 2011/11/16
Materia	I Rein	forced Conc	rete Pipe	. Joi	nt length	3.0	Ft T	otal le	ngth	38.0 <b>Ft</b>	Leng	gth Surveye	ed 38.00
Lining				Yea	ar laid		Year re	habili	tated	Wea	ther	Dry	
Purpos	e Rou	tine Assessn	nent	, , , , , , , , , , , , , , , , , , ,			Cat	121					
Additio	nal info									Structural	80	&M	Constructional
Locatio	<b>n</b> Park	ing Lot								Miscellaneo	us Hy	draulic	
Project	CH2N	/HI-2								Wo	rk Orde	er	
Northin	g			Easting	51				Eleva	ation			

**GPS Accuracy** 

0 Ft Survey. Dir Pipe Flow 38 Ft

**Coordinate System** 

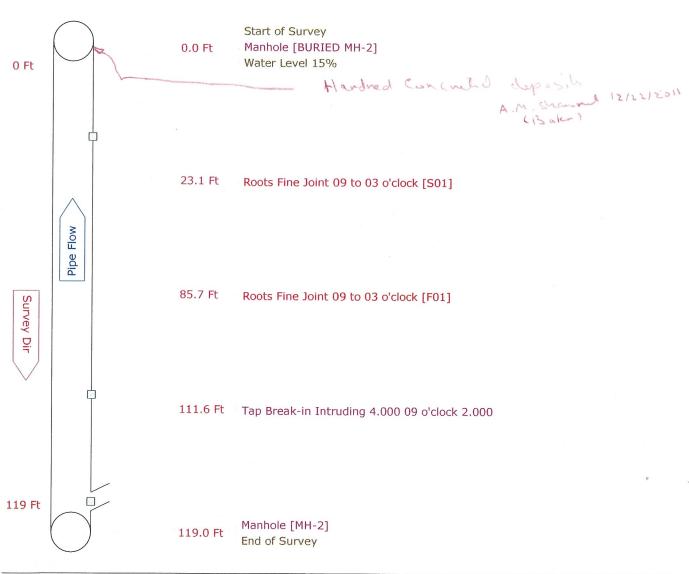
0.0 Ft

Start of Survey Manhole [BURIED MH-2] Water Level 15%

End of Pipe 38.0 Ft End of Survey



be e.e.be.rebeite.	2	101	71 12 IVIII IILL			
Setup 14 Surveyor JRH	Certificate	# U-809-9224	System Owner CIT	Y OF ALEXANDRIA		
Drainage Survey C	Customer CH2MHILL					
P/O # Date	2011/11/25 <b>Time</b> 15:34	4 Street BUSIN	IESS CENTER DR			
City ALEXANDRIA	Further location detail	ls				
Start BURIED MH-2	Rim to invert 0.00	Grade to invert	Rim to grade	Ft		
Finish MH-2	Rim to invert 0.00	Grade to invert	Rim to grade	Ft		
Use Stormwater	<b>Direction</b> Upstream	Flow control	Not Controlled Med	ia No A-5		
Shape Circular	Height 36 Width	ins Preclea	an H Yea	r Cleaned 2011/11/16		
Material Reinforced Concrete Pipe	Joint length 3.0	Ft Total length	119.0 Ft Length S	urveyed 119.00		
Lining	Year laid	Year rehabilitated	Weather Dry			
Purpose Routine Assessment		Cat				
Additional info			Structural O&M	Constructional		
Location Parking Lot			Miscellaneous Hydrau	lic		
Project CH2MHI-2			Work Order			
Northing	Easting	Eleva	tion	•		
Coordinate System GPS Accuracy						
- Containate Oyelein		01 (	3 Accuracy			





Pipe Gr	aphic Report o	f PSR	BURIED N	ЛΗ	С		for	CH2MIHILL		
Setup	15 Surveyor	JRH		Cert	ificate #	# U-809-92	24	System C	wner CITY	OF ALEXANDRIA
Drainage Survey Customer CH2MHILL										
P/O #		Date	2011/11/25	Time	15:42	Street	BUS	SINESS CENTER	RDR	
City	ALEXANDRIA		Further	locatio	n detail:	s				
Start	MH-2		Rim to	invert	0.00	Grade to	inve	rt Riı	n to grade	Ft
Finish	BURIED MH		Rim to	invert	0.00	Grade to	inve	rt Rir	n to grade	Ft
Use St	ormwater		Direction	on Ups	tream	Flow co	ntrol	Not Controlled	Media	No A-5
Shape	hape Circular Height 36 Width				ins	Prec	lean H Year Cleaned 2011/11/16			
Materia	Reinforced Conc	rete Pipe	Join	nt length	<b>3</b> .0	Ft Total	lengt	th 43.2 Ft	Length Sur	veyed 43.20
Lining			Yea	r laid		Year rehabi	litate	d Weat	<b>her</b> Dry	
Purpose	Routine Assessn	nent				Cat				
Addition	nal info							Structural	O&M	Constructional
Locatio	n Parking Lot							Miscellaneou	s Hydraulic	
Project CH2MHI-2 Work Order										

**GPS Accuracy** 

0 Ft Mold edid

Mold edid

43.2 Ft

Northing

**Coordinate System** 

Start of Survey

0.0 Ft Manhole [MH-2]
Water Level 15%

**Easting** 

43.2 Ft Manhole [BURIED MH] End of Survey

